

the main copy assembly include a microprocessor, a set of disk spindle members with each member affixed to a motorized tray, a transport tower, a data transfer unit, a vacuum regulator and an air filtration unit. The external vacuum pump is connected to the vacuum regulator by an air hose leading to a disk suction pickup unit affixed to the transport tower.

#### 1. The Microprocessor

The microprocessor is an internal control unit for the copy unit and is electrically connected to the host computer, the transport tower, the motorized tray members, and all CD-R disk drive heads. In the preferred embodiment, a 8031 microprocessor is used, but any 8-bit microprocessor capable of processing a command set of about 20 commands could be used.

The microprocessor receives user input generated by the software that is executed on the user's host computer. The computer software processes the user input into a set of ASCII commands sent to microprocessor via an RS-232 interface. The ASCII command set used is a variant of the Trace Mountain protocol that is often used to interface software to hardware copy devices. Commands sent by the computer software to the microprocessor consist of one letter or one letter and two digits. Once the microprocessor is sent a command by the host computer, the microprocessor parses the command and sends an electrical signal to the transport tower.

Depending on the command sent by the computer software, the microprocessor will transmit back to the computer software a "ready" indication, an echo of the command received, or a status indication that command received was successfully or unsuccessfully executed. This status indication is then interpreted by the computer software into user readable information displayed on the host computer's video output display.

#### 2. The Disk Spindle Members

A set of disk spindle members are stacked vertically inside the housing of the copy unit. The bottom of each disk spindle member is affixed to a horizontal motorized tray member and projects vertically from the tray member. The diameter of each disk spindle member is slightly smaller than the center hole of a CD-R disk, allowing for free vertical movement of the CD-R disk when the disk is located on the disk spindle member.

The horizontal motorized tray members are spaced vertically a distance greater than the height of each disk spindle member, allowing for free travel of the disk spindle member when the motorized tray members travel horizontally. It is expected that at least two disk spindle members are located in the housing of the copy unit, allowing one disk spindle member to hold blank CD-R disks and the other disk spindle member to hold burned CD-R disks.

#### 3. The Transport Tower

The transport tower is located on the inside wall of the housing opposite the disk spindle members. The transport tower has two vertical supports with a vertical belt positioned between the vertical supports. One end of the vertical belt passes around a pulley wheel affixed to the inside wall of the housing close to the top inner wall of the housing.

The other end of the vertical belt passes around a set of pulley wheel gears that are connected to a motor that causes the belt to rotate when the motor is engaged. Control of the motor is supplied by electrical signals sent by the microprocessor.

An arm for a disk pickup head projects horizontally from the transport tower. One end of the arm is affixed to the belt and has apertures allowing the vertical supports to pass

through and support the arm. When the motor rotates the belt, the arm is raised or lowered depending on the direction of rotation of the belt.

The other end of the arm supports a disk pickup head which has a disk suction pickup unit. The disk suction pickup unit is triangle-shaped and has a circular aperture located at its apex. The diameter of the aperture is slightly wider than the diameter of a disk spindle member and travels along a vertical line forming a transport axis as the arm is raised or lowered.

Located on the underside of the disk suction pickup unit near each vertice of the disk suction pickup unit is one suction member and one rubber stopper member. A sensor also protrudes downward from the underside of the disk suction pickup unit and relays an electrical signal back to the microprocessor indicating the presence of a target disk near the disk suction pickup unit.

Additionally, during operation of the disk suction pickup unit, RAM memory located in the microprocessor or electrically connected to the microprocessor retains data for each disk spindle member corresponding to the approximate vertical distance the disk suction unit must travel before retrieving a blank CD-R disk or placing a burned CD-R disk back onto the disk spindle member.

When the disk suction pickup unit is operated, the suction members draw in air, causing the target disk to adhere to the suction members.

The size and placement of the arm and the disk suction pickup unit are chosen so that during a disk pick-up or drop-down operation from a selected disk spindle member, the motorized tray affixed to the selected disk spindle member is configured in its extended position, and the selected disk spindle member passes through the aperture of the disk suction pickup unit.

In a typical disk transport operation, the microprocessor issues a sequential set of electrical signals that are translated into a sequential set of operations performed by the motor, the motorized trays on the stacked recordable disk drive members and supporting the disk spindle members, and the disk suction pickup unit. For example, the following sequential operations controlled by the microprocessor occur when the copy unit transfers the top CD-R disk from a stack of CD-R disks surrounding a selected spindle to the disk suction pickup unit:

the motor raises the disk suction pickup unit to a height such that all components of the disk suction pickup unit are above the top of the selected disk spindle member; the motorized tray affixed to the selected disk spindle member extends outward so that the selected disk spindle member lies along the transport axis;

1) the motor lowers the disk suction pickup unit along the disk spindle member until the suction members make contact with the CD-R disk;

the suction members engage and hold the CD-R disk;

the motor raises the disk suction pickup unit along the disk spindle member until the CD-R disk held by the suction members is above the top of the selected disk spindle member;

the motorized tray affixed to the selected disk spindle member retracts, allowing the disk suction pickup unit to travel freely along the transport axis.

#### 4. The Data Transfer Unit

The data transfer unit comprises a set of stacked disk drive receptacle members and a variable number of stacked recordable disk drive members. The stacked disk drive receptacle members are stacked vertically inside the housing